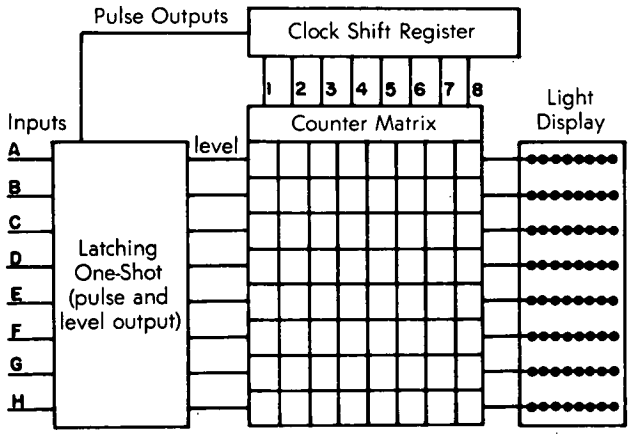
NASA TECH BRIEF

NASA Pasadena Office

Event-Sequence Detector

The problem:

To detect the sequence of failures which can occur almost simultaneously (within 0.3 microsecond) in electronic assemblies such as traveling-wave amplifier tubes.



The solution:

An event-sequence detector consisting of a matrix of storage elements which are activated by coincidence of failure-voltage pulses and clock pulses.

How it's done:

Voltage inputs corresponding to failure modes in the circuit under study are fed to the event-sequence detector shown in the diagram. Each of the input lines is connected to one of a series of latching, one-shot circuits. As an example of operation of the event-sequence detector, consider input A; when the input voltage level changes because of failure in that branch of the circuit under study, the latching one-shot circuit is set, and a pulse from the circuit activates the clock shift register. Simultaneously, enabling-voltage is fed by the latching one-shot circuit to level A of the counter matrix, and the memory flip flop A-1 is set by coincidence with the clock shift register voltage appearing in column 1. Once a latching circuit is set by an input voltage, it becomes unresponsive to its input; thus, a latching circuit can deliver only one pulse to the row of memory elements to which it is connected.

The operation of the event sequence counter is such that the shift register shifts only one count for each of N inputs; therefore, were only A, H, and C to be activated, the output indication would of necessity be A-1, H-2, C-3.

The clock frequency used for the event sequence detector can be selected to provide the time resolution demanded by the test at hand; a frequency of 3.5 MHz has been used for the testing of traveling-wave tubes. Thus, events which occurred every 0.286 microsecond were recorded.

Note:

Requests for further information may be directed to:

Technology Utilization Officer
NASA Pasadena Office
4800 Oak Grove Drive
Pasadena, California 91103
Reference: TSP 73-10278

(continued overleaf)

Patent status:

This invention is owned by NASA, and a patent application has been filed. Inquiries concerning non-exclusive or exclusive license for its commercial development should be addressed to:

NASA Patent Counsel
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